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DOE/RL-2004-76  
Revision 0 REISSUE

# Radioactive Air Emissions Notice of Construction for 2706-T Operations

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Prepared for the U.S. Department of Energy  
Assistant Secretary for Environmental Management



**United States  
Department of Energy**  
P.O. Box 550  
Richland, Washington 99352

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# Radioactive Air Emissions Notice of Construction for 2706-T Operations

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Fluor Hanford, Inc.

Date Published  
November 2005

Prepared for the U.S. Department of Energy  
Assistant Secretary for Environmental Management



**United States  
Department of Energy**  
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*J. D. Ararat*      11/29/2005  
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## ACRONYMNS

1		
2		
3		
4	ACT	Atmosphere Clean-up Train
5	ALARACT	as low as reasonably achievable control technology
6	ANSI	American National Standards Institute
7	ASME	American Society of Mechanical Engineers
8		
9	BARCT	best available radionuclide control technology
10		
11	CAM	continuous air monitor
12	CFR	Code of Federal Regulations
13	Ci	curie
14	Ci/ml	curie per milliliter
15	Cm <sup>2</sup>	square centimeter
16	COLIWASA	composite liquid waste sampler
17		
18	DOE	U.S. Department of Energy
19	DOE-RL	U.S. Department of Energy, Richland Operations Office
20	dpm	disintegrations per minute
21		
22	Ecology	Washington State Department of Ecology
23		
24	ft	feet
25		
26	HEPA	high-efficiency particulate air (filter)
27	HVAC	heating, ventilation, and air conditioning
28		
29	LIGO	Laser Interferometer Gravitational Wave Observatory
30		
31	m	meter
32	MEI	maximally exposed individual
33	mrem	millirem
34	mrem/yr	millirem per year
35		
36	NDA	nondestructive assay
37	NDE	nondestructive examination
38	NOC	notice of construction
39		
40	PCB	polychlorinated biphenyl
41	PCM	personnel contamination monitor
42	PTE	potential to emit
43		
44	RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
45		
46	S Plant	Reduction Oxidation Facility
47	SEPA	<i>State Environmental Policy Act of 1971</i>
48		

**ACRONYMNS (cont)**

1		
2		
3		
4	TEDE	total effective dose equivalent
5	TRU	transuranic
6	TSD	treatment, storage, and/or disposal
7		
8	VOA	volatile organic analyses
9		
10	WAC	Washington Administrative Code
11	WDOH	Washington State Department of Health
12	WIPP	Waste Isolation Pilot Plant
13		
14	yr	year
15		
16		
17		
18		

## METRIC CONVERSION CHART

Into metric units

Out of metric units

If you know	Multiply by	To get	If you know	Multiply by	To get
<b>Length</b>			<b>Length</b>		
inches	25.40	millimeters	millimeters	0.03937	inches
inches	2.54	centimeters	centimeters	0.393701	inches
feet	0.3048	meters	meters	3.28084	feet
yards	0.9144	meters	meters	1.0936	yards
miles (statute)	1.60934	kilometers	kilometers	0.62137	miles (statute)
<b>Area</b>			<b>Area</b>		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.09290304	square meters	square meters	10.7639	square feet
square yards	0.8361274	square meters	square meters	1.19599	square yards
square miles	2.59	square kilometers	square kilometers	0.386102	square miles
acres	0.404687	hectares	hectares	2.47104	acres
<b>Mass (weight)</b>			<b>Mass (weight)</b>		
ounces (avoir)	28.34952	grams	grams	0.035274	ounces (avoir)
pounds	0.45359237	kilograms	kilograms	2.204623	pounds (avoir)
tons (short)	0.9071847	tons (metric)	tons (metric)	1.1023	tons (short)
<b>Volume</b>			<b>Volume</b>		
ounces (U.S., liquid)	29.57353	milliliters	milliliters	0.033814	ounces (U.S., liquid)
quarts (U.S., liquid)	0.9463529	liters	liters	1.0567	quarts (U.S., liquid)
gallons (U.S., liquid)	3.7854	liters	liters	0.26417	gallons (U.S., liquid)
cubic feet	0.02831685	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645549	cubic meters	cubic meters	1.308	cubic yards
<b>Temperature</b>			<b>Temperature</b>		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
<b>Energy</b>			<b>Energy</b>		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.94782	British thermal unit per second	British thermal unit per second	1.055	kilowatt
<b>Force/Pressure</b>			<b>Force/Pressure</b>		
pounds (force) per square inch	6.894757	kilopascals	kilopascals	0.14504	pounds per square inch

06/2001

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Third Ed., 1993, Professional Publications, Inc., Belmont, California.

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**RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION FOR  
2706-T OPERATIONS**

This document serves as a notice of construction (NOC) application, pursuant to the requirements of Washington Administrative Code (WAC) 246-247. "Radiation Protection - Air Emissions," and Title 40 Code of Federal Regulations (CFR), Part 61, "National Emission Standards for Hazardous Air Pollutants," for conducting treatment, storage, and decontamination (TSD), and related activities at the 2706-T Facility.

**1.0 FACILITY LOCATION**

*Name and address of the facility, and location (latitude and longitude) of the emission unit:*

The address and geodetic coordinates for 2706-T Facility (represented by the Hanford Meteorological Station) are as follows:

U.S. Department of Energy, Richland Operations Office (DOE-RL)  
Hanford Site  
Richland, WA 99352

46° 33' 48" North Latitude  
119° 36' 22" West Longitude

The 2706-T Facility is located inside the controlled-area fence of the 200 West Area on the Hanford Site (Figures 1 and 2).

**2.0 RESPONSIBLE MANAGER**

*Name, title, address and phone number of the responsible manager:*

Mr. Matthew S. McCormick, Assistant Manager for Central Plateau  
U.S. Department of Energy, Richland Operations Office  
P.O. Box 550  
Richland, Washington 99352  
(509) 373-9971.

**3.0 TYPE OF PROPOSED ACTION**

*Identify the type of proposed action for which this application is submitted.*

This NOC addresses an insignificant modification to the existing 2706-T Facility emission unit (modification of NOC AIR 02-1214).

**4.0 STATE ENVIRONMENTAL POLICY ACT**

*If the project is subject to the requirements of the State Environmental Policy Act (SEPA) of 1971 contained in chapter 197-11 WAC, provide the name of the lead agency, lead agency contact person, and their phone number.*

Under WAC 197-11-845, the proposed action and proposed activities are categorically exempt from the requirements of SEPA.

## 5.0 PROCESS DESCRIPTION

*Describe the chemical and physical processes upstream of the emission unit(s).*

The 2706-T Facility (Figure 3) includes the 2706-T Building and the 2706-TA Building. The 2706-T Building and the 2706-TA Building make up a single structure and are discussed in this section. The current mission of the 2706-T Facility involves various management activities related to low-level waste, mixed low-level waste, and transuranic (TRU) waste.

### 5.1 2706-T BUILDING

The 2706-T Building was built in 1959 as a low-level radiological decontamination building. The original building was 66 feet (ft) [22 meters (m)] long and 50 ft (15 m) wide. The 2706-TA Building was added in 1994/5 over the concrete pad on the west side of 2706-T Building. One roll-up door and one man-door provide access between 2706-T Building and 2706-TA Building. Three heat pumps provide heating, ventilation, and air conditioning (HVAC) for the 2706-T Building operations area. Waste handling and decontamination operational areas of the 2706-T Building are open and unobstructed. The 2706-T Building is a pre-engineered metal building. The foundation is concrete slab on grade throughout. The 2706-T Building includes two pits, one for decontamination and treatment of motor vehicles and other large equipment and one for rail car decontamination and treatment. These pits can also be used to support collection of liquids from waste handling activities.

Current operations in 2706-T Building include waste sampling, packaging and repackaging, head-gas sampling, managing waste containers, decontamination/refurbishment, maintenance, recycling, storage, housekeeping, surveillance, and movement activities. One egress door leads directly to the exterior of 2706-T Building. Other doors lead directly to the non-ventilated lean-to on the north side, and an air lock provides access to the 2706-TA Building Operations Area. The railway and auto pits have metal grating and some wooden covers to prevent falls into the pits. An epoxy floor sealant has been applied to all operational area floors. To support these operations, greenhouse(s) (relocatable confinement structures) are used as necessary in 2706-T. Greenhouses are temporary or semi permanent radioactive material confinement structures, and can be used for contamination control purposes.

The Atmosphere Clean-up Train (ACT)-1 system, sprinkler system riser room, and electrical room are located in the south lean-to (non-ventilated).

### 5.2 2706-TA BUILDING

The 2706-TA Building is an addition to the 2706-T Building installed in the 1990s as an add-on over the concrete storage pad located west of the building. The 2706-TA Building is approximately 45 feet (15 m) wide by 54 feet (18 m long) by 22.8 feet (7.6 m) high. There are two rollup doors located at the west end of the building. The 2706-TA Building has steel primary and secondary structural elements and corrugated sheet metal exterior siding and roofing panels. Three heat pumps provide heating, ventilation, and air conditioning (HVAC) for the 2706-TA Building operations area. The floor is concrete slab on grade. An epoxy floor sealant has been applied to all operational area floors. Waste handling and decontamination operational areas of the 2706-TA Building are open and unobstructed.

Current operations in 2706-TA Building include waste sampling, packaging and repackaging, head-gas sampling, managing waste containers, decontamination/refurbishment, maintenance, recycling, storage, housekeeping, surveillance, and movement activities. To support waste activities, greenhouses are used if necessary. Greenhouses are temporary or semi permanent radioactive material confinement structures, and can be used for contamination control purposes.

Attached to the south side of 2706-TA Building is a lean-to made up of two rooms. The larger room houses the new ACT-2 high-efficiency particulate air (HEPA) filter system, which serves the operational areas. The ACT-1 and ACT-2 systems exhaust through a common stack, specifically the 296-T-7 stack. The second room houses electronic controllers and electrical switchgear supporting operations.

### **5.3 2706-T FACILITY WASTE MANAGEMENT ACTIVITIES**

The following sections briefly discuss routine waste management activities (i.e., low-level waste, mixed low-level waste, and TRU waste) that have and will occur in the 2706-T Facility.

#### **5.3.1 Packaging and Repackaging Waste**

Packaging and repackaging activities are performed for waste generated in the 2706-T Facility as well as for other onsite and offsite generators. The repackaging of waste supports waste acceptance criteria for other TSD facilities. For example: Prohibited items from waste packages (i.e., waste items that do not meet acceptance criteria) are removed and either staged for later handling or repackaging using remote or manual methods. Packaging and repackaging activities can include the following:

- Sorting
- Segregation
- Removing prohibited items
- Compositing/aggregating solids or liquids
- Adding absorbent
- Size reduction [e.g., cutting (jaws, saws, torches), bending, folding, crushing (e.g., drum crusher), shredding, compacting, or similar methods that do not have a higher extent of radioactive material disruption]
- Void filling
- Pressure relief/release (e.g., aerosol cans, gas cylinders, drums, or other similar containers).

Some packaging of waste (e.g., personal protective equipment, maintenance waste, types of innocuous waste resulting from surveillances, inspections, and maintenance) that does not create a potential to emit (PTE) occurs within the 2706-T Facility when the 296-T-7 exhaust stack emission system is shutdown.

### 5.3.2 Verification Activities

Verification support activities are provided for waste and other materials that are generated on or off the Hanford Site. Verification activities can consist of the following:

- Physical observation
- Nondestructive examination (NDE)
- Nondestructive assay (NDA)
- Chemical field screening
- Radiological surveys
- Radiological samples
- Headspace gas sampling and analysis
- Chemical sampling.

### 5.3.3 Sampling Activities

Sampling of waste generated by operations or by other onsite or offsite generators is performed. The purpose of sampling is to confirm process knowledge, characterize waste, support verification, and determine land disposal requirements as applicable. Sampling can consist of the following:

- Field screening [e.g., pH paper, oxidizer, volatile organic analyses (VOAs), polychlorinated biphenyls (PCBs), or similar screening parameters]
- Obtaining a sample for analysis [e.g., grab, composite liquid waste sampler (COLIWASA), or other similar sampling techniques]
- Shipping/transferring the samples to an approved laboratory for analysis
- Disposition of sample returns (e.g., placement back into the parent container or another approved container/tank)
- Headspace gas sampling and analysis [typically in support of the Waste Isolation Pilot Plant (WIPP)]
- Tank sampling (including sampling for liquid, sludge, salt cake, and composites).

### 5.3.4 Decontamination/Refurbishment Activities

Materials, equipment, and waste can be decontaminated (e.g., free release, reduce the radiological levels, or other similar criteria) using a variety of methods. Equipment can also be repaired and refurbished within the 2706-T Facility. Decontamination and refurbishment in the 2706-T Facility include the following:

- 1 • Water (fog, high or low-pressure spraying)
- 2
- 3 • Steam
- 4
- 5 • Ice blasting (i.e., ice, CO<sub>2</sub>)
- 6
- 7 • Vacuum blasting
- 8
- 9 • Brushing
- 10
- 11 • Abrasive tools
- 12
- 13 • Scraping
- 14
- 15 • Washing (e.g., chemicals/detergents)
- 16
- 17 • Immersion
- 18
- 19 • Electro-polishing
- 20
- 21 • Cutting (e.g., removal by sawing, torching more highly radioactive components or other similar
- 22 methods)
- 23
- 24 • Bearing replacement
- 25
- 26 • Pump and motor alignment
- 27
- 28 • Electrical repairs
- 29
- 30 • Rust/paint removal
- 31
- 32 • Sand Blasting
- 33
- 34 • Vacuuming.
- 35

36 In addition, decontamination of structural components (e.g., walls, cells, or other similar surfaces) within  
37 the 2706-T Facility are performed.

### 40 5.3.5 Maintenance Activities

41 Because of 2706-T Facility's current and future mission, (e.g., support of the cleanup of the Hanford Site  
42 and other DOE Sites), a variety of preventative and/or repair maintenance activities are performed.  
43 Maintenance activities can consist of the following:

- 45 • Painting
- 46
- 47 • Crane maintenance
- 48
- 49 • Electronic systems functional checks and repairs [e.g., continuous air monitors (CAMs), personnel
- 50 contamination monitors (PCMs), or other similar equipment]

- Calibrations
- Rollup door maintenance
- Mechanical overhaul and rebuilding
- Heat pump maintenance
- Exhaust fan maintenance
- Transformer maintenance
- Scale system maintenance
- Wire rope inspections
- Stack system maintenance (e.g., fan lubes or other similar maintenance activities)
- Forklift maintenance.

Certain maintenance activities (e.g., wire rope inspections, lubrication, functional tests, calibrations, or similar innocuous activities) that do not generate a potential to emit, can occur within the 2706-T Facility when the 296-T-7 exhaust stack emission system is shutdown.

### **5.3.6 Waste Treatment Activities**

As part of the T Plant Complex, the 2706-T Facility is a RCRA treatment and storage facility permitted by the Washington State Department of Ecology (Ecology). Treatment activities can consist of the following:

- Macroencapsulation
- Absorption
- Neutralization
- Immobilization
- Encapsulation
- Stabilization (e.g., solidification, cementation, grouting, or other similar methods)
- Compaction
- Amalgamation
- Segregation
- Shredding

- Venting/drilling
- Size reduction.

### **5.3.7 Recycling Activities**

Materials are recycled whenever possible. Examples of recycling materials can consist of the following:

- Ferrous metal
- Nonferrous metal
- Light bulbs (e.g., sodium, mercury, incandescent, fluorescent, or similar types)
- Aerosol cans
- Oils
- Batteries (e.g., lead-acid, alkaline, lithium, or similar types).

### **5.3.8 Storage Activities**

The 2706-T Facility stores materials (e.g., chemicals, equipment, or similar materials), and waste in support of cleanup and other operations. Storage can consist of the following:

- Containerized (e.g., boxes, drums, tanker trucks/railcars, large diameter containers, or similar containers) and uncontainerized waste and/or materials meeting waste acceptance criteria
- Tank storage
- Equipment storage
- Collection and storage within sumps and pipes.

### **5.3.9 Equipment, Materials, and Waste Movement Activities**

The movement of equipment, materials, and waste is necessary to support operations, maintenance, or similar activities. Movement activities (e.g., using a forklift, crane, truck, dolly, personnel, or similar equipment) can consist of, but is not limited to, the following:

- Receiving waste (e.g., liquid, solid, semi-solid ) for storage and/or treatment
- Movement of waste (e.g., liquid, solid, semi-solid) and equipment
- Movement of liquids, sludges, or other waste from containers and/or tanks via transfer lines
- Waste container transfers

- Placing and storing chemical products in flammable cabinets or other approved storage locations
- Movement of contaminated material (either radiological or chemical) in support of the T-Plant Mission.

### 5.3.10 Housekeeping Activities

Housekeeping activities involve maintaining 2706-T Facility in a clean and orderly condition. Housekeeping activities can consist of, but are not limited to, the following:

- Sweeping (e.g., brooms)
- Mopping (e.g., squeegees or other similar techniques)
- Vacuuming
- Dusting
- Wiping (e.g., sponges, towels, or other similar methods)
- Picking up debris
- Removal of trash.

### 5.3.11 Surveillance Activities

Surveillance activities involve walking down and inspecting various areas, systems, and components. Surveillances typically consist of daily, weekly, and monthly inspections of waste containers, tanks, buildings, or similar locations. Surveillances are subject to change (adding, deleting and/or modifying) as operations, maintenance, engineering, radiological control, and regulations dictate. The following are examples of surveillances performed in the 2706-T Facility:

- Container storage area inspections
- Treatment and storage tanks and ancillary equipment inspections
- General condition of building structures inspections
- Safety equipment inspections (e.g., safety showers, eye wash stations, first aid kits, fire extinguishers, fire suppression systems, communication equipment, spill kits, emergency lighting, Scott Air-Pak®, personnel contamination monitors, masks)
- Cold weather surveillances (typically done between October 1 and March 31)
- Inspection of equipment (e.g., 296-T-7 exhaust stack cabinet and exhaust fans, differential pressure gauges, or similar equipment)

---

Scott Air-Pak® is a registered trademark of Scott Aviation Inc.



- Inspection of HEPA filtered vacuums
- Radiological surveys.

Surveillances, inspections, and maintenance activities that do not have the potential to create airborne contamination can occur within the 2706-T Facility when the 296-T-7 exhaust stack emission system is shutdown.

## 6.0 PROPOSED CONTROLS

*Describe the existing and proposed abatement technology. Describe the basis for the use of the proposed system. Include expected efficiency of each control device, and the annual average volumetric flow rate in cubic meters/second for the emission unit.*

Air filtration through the 296-T-7 stack is achieved with prefilters and filters. There are two separate, independent ventilation (abatement) systems that ventilate out the 296-T-7 Stack, the ACT-1 and the ACT-2. The core of the 2706-T Building air filtration system is the ACT-1 unit, which is located in a separate HVAC room connected directly to the 2706-T Building. A similar system exists for the 2706-TA Building (ACT-2). The two units share the existing exhaust stack (Figure 4). The ACT-2 HEPA filter bank is identical to ACT-1. Each system currently contains twelve 99.97 percent efficient HEPA filters, which are designed to remove particulate matter greater than 0.3 microns from the air stream. The HEPA filter bank has differential pressure monitoring and alarm annunciation. The annual average volumetric flow rate is 0.54 m<sup>3</sup>/sec. Because the facility operates in batch mode, the system operates intermittently as noted in sections 5.3.1, 5.3.5, and 5.3.11. The heater and demister units are not used for abatement control. The release fraction associated with drilling of drums in preparation for venting with a Nucfil<sup>®</sup>, is a time weighted value which allows for a release fraction of 1E-03 applied to the drum curie contents for only 1 hour. Once fitted with a filter, a release fraction of 2E-09 is used (see Table 1).

## 7.0 DRAWINGS OF CONTROLS

*Provide conceptual drawings showing all applicable control technology components from the point of entry of radionuclides into the vapor space to release to the environment.*

Figure 1. Hanford Site

Figure 2. Location of T Plant Complex and the 2706-T Facility in the 200 West Area

Figure 3. 2706-T Facility Floor Plan

Figure 4. 296-T-7 system schematic.

## 8.0 RADIONUCLIDES OF CONCERN

*Identify each radionuclide that could contribute greater than ten percent of the potential-to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential-to-emit TEDE to the MEI.*

---

Nucfil<sup>®</sup> is a registered trademark of Nuclear Filter Technology.

The PTE for individual radionuclides was based on analysis of the waste packages that are expected to be processed in the 2706-T Facility under this NOC (See Table 1). The radionuclides expected to contribute greater than 10 percent to the PTE are: Am-241 (44%), Cs-137 (10%), Pu-239 (14%), and Pu-240 (13%). Other radionuclides that might be encountered, at less than 10 percent of the total, include: K-40, Cm-242, Am-243, Cm-244, Co-60, Cs-134, Cs-137, Eu-154, Eu-155, H-3, Nb-94, Np-237, Pu-238, Pu-241, Pu-242, Pu-244, Ra-226, Ru-106, Sb-126, Th-228, Th-234, Rn-219, Rn-220, Rn-222, Sb-125, Sr-90, U-233, U-234, U-235, U-236, and U-238. In addition, essentially any radionuclide isotope could be encountered.

## 9.0 MONITORING

*Describe the effluent monitoring system for the proposed control system. Describe each piece of monitoring equipment and its monitoring capability, including detection limits, for each radionuclide that could contribute greater than ten percent of the potential to emit TEDE to the MEI, or greater than 0.1 mrem/yr potential to emit TEDE to the MEI, or greater than twenty-five percent of the TEDE to the MEI, after controls. Describe the method for monitoring or calculating those radionuclide emissions. Describe the method with sufficient detail to demonstrate compliance with the applicable requirements.*

The major components of the sampling/monitoring system are:

- Sample probes from the exhaust stack
- Record sample holder
- Record sample flow control system
- Vacuum supply.

The 296-T-7 stack is a minor stack that operates only when there is a potential to emit (e.g., decontamination, headspace gas sampling, repackaging, treatment activities as noted in section 5.3). The proposed operations will be subject to monitoring requirements specified in 40 CFR 61.93(b)(4)(i) and WAC 246-247-075(3). In accordance with these requirements, monitoring will be performed to verify emissions and to support an estimate of the quantity of those emissions for annual reporting purposes. Particulate air filters are collected monthly, composited quarterly and analyzed.

The minimum detectable concentrations for radionuclides that could contribute greater than 10% of the PTE are: 2.0E-15 microCi/ml (total alpha) and 1.9E-14 microCi/ml (total beta), 1.9E-15 microCi/ml (Am-241), 1.9E-14 microCi/ml (Cs-137) and 2.0E-15 microCi/ml (Pu-239 and Pu-240).

## 10.0 ANNUAL POSSESSION QUANTITY

*Indicate the annual possession quantity for each radionuclide.*

The total unabated PTE for this NOC is 5.8E-02 mrem/year as shown in Table 1. Also, 2706-T Facility can handle any radionuclide listed on the periodic table at any time. For purposes of this NOC application only, the annual possession quantity (APQ) is based upon earlier measurements and estimates for operation activities within 2706-T Facility to include drum venting, torch cutting, and such activities identified in Section 5.0. The APQ and resultant estimate of unabated curies potentially emitted are as listed in Table 1.

## 11.0 PHYSICAL FORM

*Indicate the physical form of each radionuclide in inventory: Solid, particulate solids, liquid, or gas.*

All the radionuclides listed in Section 10.0 are present as particulate solids or liquids at ambient conditions except for tritium and radon which are gases and torch cutting activities which would release gases (conservatively assumed to be comprised entirely of americium and cesium) as shown in Table 1. Torch cutting activities will be limited to  $2.7\text{E-}06$  mrem/yr for Am-141 and  $2.7\text{E-}03$  mrem/yr for Cs-137 TEDE to the MEI. As shown in Table 1, the gaseous contribution to the PTE mrem/yr TEDE to the MEI is less than 3% overall.

## 12.0 RELEASE FORM

*Indicate the release form of each radionuclide in inventory: Particulate solids, vapor, or gas. Give the chemical form and ICRP 30 solubility class, if known.*

All the radionuclides listed in Section 8.0 except for tritium and radon are released as particulate solids unless torch cutting is being performed. Torch cutting will be limited to 3 cuts per package for a total of 8 packages per year. Maximum contamination levels assumed for vaporization calculations are  $6,000,000$  dpm/ $100\text{ cm}^2$  beta/gamma and/or  $6,000$  dpm/ $100\text{ cm}^2$  alpha. The gaseous radionuclide contributions are considered inconsequential as the unabated PTE contribution for the gaseous radionuclides is less than 3% of the TEDE to the MEI mrem/yr total.

## 13.0 RELEASE RATES

*(a) New emission unit(s): Give predicted release rates without any emissions control equipment (the potential-to-emit) and with the proposed control equipment using the efficiencies described in subsection (6) of this section.*

Not applicable.

*(b) Modified emission unit(s): Give predicted release rates without any emissions control equipment (the potential-to-emit) and with the existing and proposed control equipment using the efficiencies described in subsection (6) of this section. Provide the latest year's emissions data or emissions estimates.*

*In all cases, indicate whether the emission unit is operating in a batch or continuous mode.*

The total unabated (without any emissions control equipment) release rates as shown in Table 1 are  $5.8\text{E-}02$  mrem/yr and the abated release rates are  $1.8\text{E-}03$  mrem/yr using the appropriate WAC 246-247-30(21)(a) release fraction ( $1.0\text{E-}3$  for particulate solids and 1.0 for gases). This includes a throughput maximum of 9,000 containers of TRU waste using a time weighted average with a vent time of 1 hour per container as shown in Table 1. A release fraction of  $2\text{E-}09$  was applied to those drums fitted with NucFil® filters. Abated emissions (total beta) for 2004 were measured to be  $7.8\text{E-}10$  mrem/yr as reported in the annual air emissions report.

This emission unit operates in batch mode.

## 14.0 LOCATION OF MAXIMALLY EXPOSED INDIVIDUAL

*Identify the MEI by distance and direction from the emission unit.*

The maximally exposed individual (MEI) for emissions from the 2706-T Facility, is located at the Laser Interferometer Gravitational Wave Observatory (LIGO), approximately 18.3 kilometers east southeast of the Reduction Oxidation Facility (S Plant), conservatively chosen to represent 200 West Area. Dose estimates for unit curie (Ci) releases of selected radionuclides were calculated for emissions from the 200 West Area. These dose estimates were calculated for an onsite member of the public working at LIGO, who works within the Hanford Site boundary, and who eats food grown regionally. The unit curie dose factors and related assumptions and calculations are documented in the reference document HNF-3602.

## 15.0 TOTAL EFFECTIVE DOSE EQUIVALENT TO THE MAXIMALLY EXPOSED INDIVIDUAL

*Calculate the TEDE to the MEI using an approved procedure. For each radionuclide identified in subsection (8) of this section, determine the TEDE to the MEI for existing and proposed emission controls, and without any existing controls using the release rates from subsection 13 of this section. Provide all input data used in the calculations.*

The total effective dose is the total abated PTE for all activities in this NOC (see response to item 13), which is less than  $1.8\text{E-}03$  mrem/year. The total unabated PTE for all activities in this NOC is less than  $5.8\text{E-}02$  mrem/year as shown in Table 1.

## 16.0 COST FACTORS OF CONTROL TECHNOLOGY COMPONENTS

*Provide cost factors for construction, operation and maintenance of the proposed control technology components and the system, if a BARCT or ALARACT demonstration is not submitted with the NOC.*

Washington State Department of Health (WDOH) has provided guidance that HEPA filters generally are considered best available radionuclide control technology (BARCT) for particulate emissions (AIR 92-107). Control technology that meets BARCT requirements also meets as low as reasonably achievable control technology (ALARACT) requirements. With the exception of gases which are accounted for by calculation, the radionuclides of concern are particulates, therefore, it is proposed that the controls described in Section 6.0 be accepted as BARCT for the operations described in section 5.0.

Cost factor inclusion is not applicable. The proposed activity is an insignificant modification to existing facilities, using attendant existing ventilation systems. The ventilation systems use HEPA filtration, which is recognized as BARCT.

## 17.0 DURATION OR LIFETIME

*Provide an estimate of the lifetime for the facility process with the emission rates provided in this application.*

Activities are schedule to be initiated in Calendar Year 2005 and be completed by 2029.

## 18.0 STANDARDS

Indicate which of the following control technology standards have been considered and will be complied with in the design and operation of the emission unit described in this application:

ASME/ANSI AG-1, Code on Nuclear Air and Gas Treatment (where there are conflicts in standards with the other listed references, this standard shall take precedence)

ASME/ANSI N509, Nuclear Power Plant Air-Cleaning Units and Components

ASME/ANSI N510, Testing of Nuclear Air Treatment Systems

ANSI/ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities

40 CFR 60, Appendix A, Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17.

There are two separate, independent ventilation (abatement) systems that ventilate out the 296-T-7 Stack, the ACT-1 and the ACT-2.

The abatement control system for the 2706-T Building area, referred to as the ACT-1, was installed before this requirement for control technology standards was specified in WAC 246-247 (April 1994). Although ASME/ANSI N509 and ASME/ANSI 510 were available at time of construction, and followed as guidance, there was no regulatory requirement for compliance with the listed standards.

Design for the abatement control system for the 2706-TA Building area, referred to as the ACT-2, began at about the same time that the requirement for control standards was specified in WAC 246-247. ASME/ANSI N509 and ASME/ANSI 510 were the codes of record used during the design and installation process.

The 2706-T and 2706-TA Building areas were designed and built at different times but exhaust out the same stack. The ventilation systems for both units (ACT-1 and ACT-2) were designed and installed applying ASME/ANSI N509 and ASME/ANSI 510 as described in the first two paragraphs of this section.

Adequacy of the design is supported by operational history, maintenance, inspections, and annual HEPA filter testing, which demonstrate that the intent of the standard is met. In lieu of strict compliance with the current listed standards, or a list of the standards to which the ventilation system actually was designed and built, the 2706-T Facility relies on a performance based approach.

- ASME/ANSI AG-1 (first promulgated in 1985, and revised in 1991, 1994, and 1997):

ASME/ANSI AG-1 was not used in the design and installation of the ACT-1 and ACT-2 ventilation system.

As of the date of this NOC, the HEPA filters for the ACT-1 and ACT-2 have never been replaced. When required, Replacement HEPA filters will be procured using HNF-S-0552, "Procurement Specification for Standard, Nuclear Grade, High Efficiency Particulate Air Filters." This procurement specification ensures that replacement HEPA filters meet the requirements of section FC in ASME/ANSI AG-1.

- ANSI/ASME NQA-1 (first promulgated in 1985):

Quality assurance for sampling of emissions and subsequent analysis is addressed in HNF-EP-0528, *NESHAP Quality Assurance Project Plan for Radioactive Airborne Emissions* (all of Sections 2.0, 3.0 and 5.0), which was written in accordance with applicable NQA-1 requirements.

- 40 CFR 60, Appendix A:

40 FR 60, Appendix A, methods are not applicable to minor stacks.

- ANSI N13.1:

The sampling systems for the minor stack meets ANSI N13.1-1969 criteria.

Adequacy of the sampling system is demonstrated by inspection, calibration, and maintenance activities as scheduled in current 2706-T facility specific procedures.

## 19.0 REFERENCES

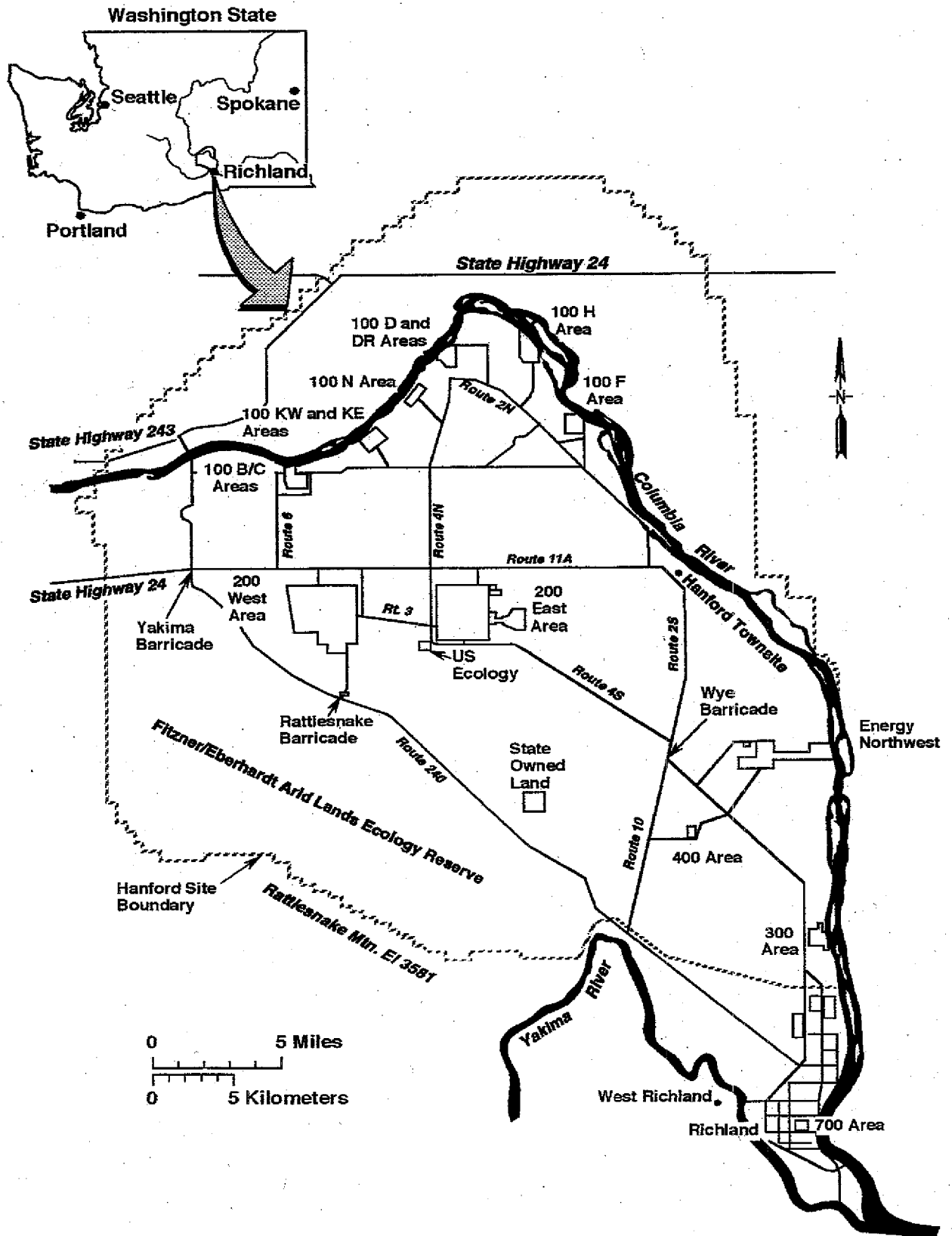
AIR 92-107, Letter, WDOH to DOE-RL, "Surveillance Report Generated by the DOH of KE & KW Basin on 09/16/1992", October 05, 1992.

DOE/RL-2005-06, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2004*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

HNF-3602, *Calculating Potential-to-Emit Releases and Doses for FEMPS and NOCs*, latest revision, Fluor Hanford, Richland, Washington

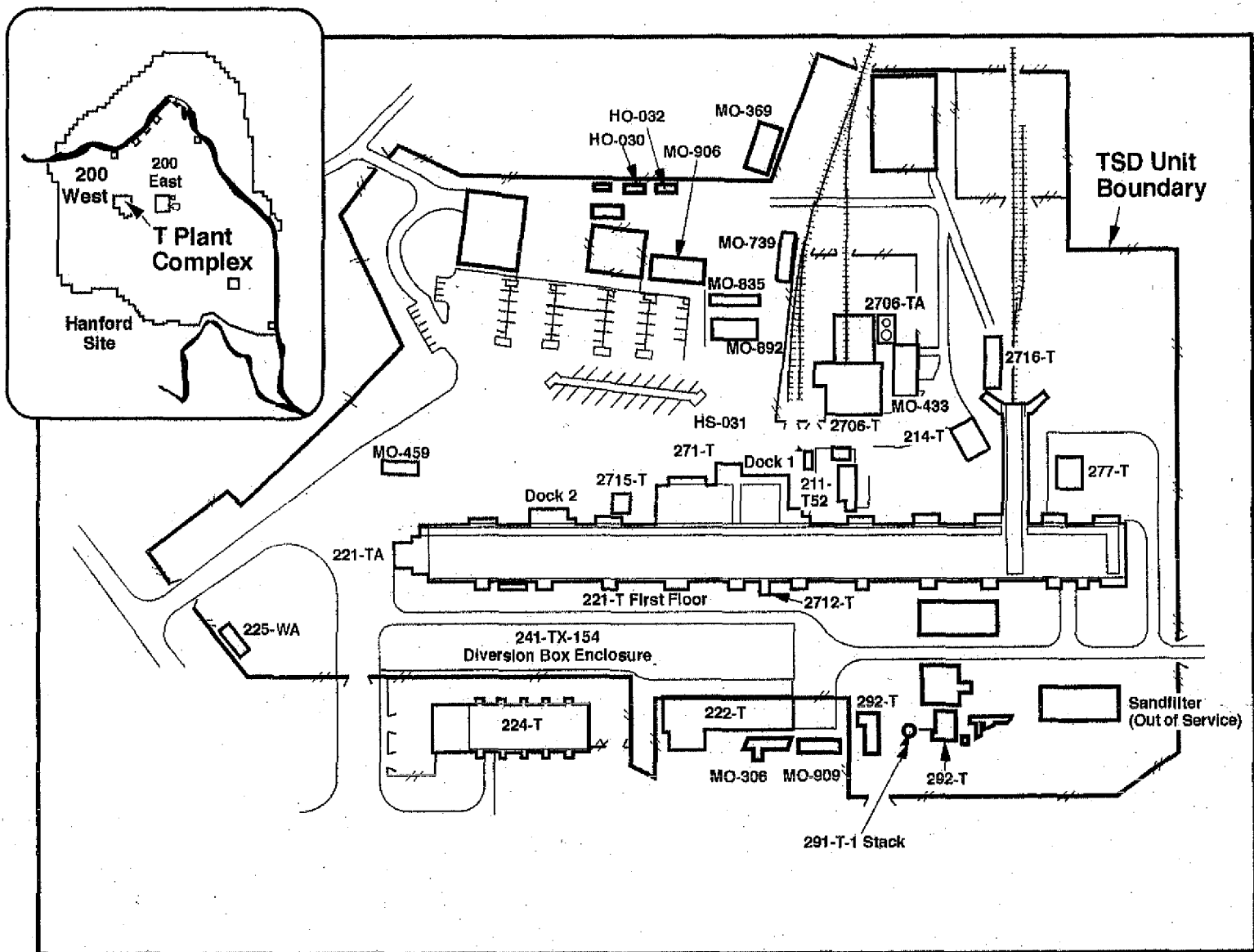
HNF-EP-0528, *NESHAP Quality Assurance Project Plan for Radioactive Air Emissions*, latest revision, Fluor Hanford, Richland, Washington.

HNF-S-0552, "Specification for Procurement and Onsite Storage of Nuclear Grade High Efficiency Particulate Air (HEPA) Filters", Fluor Hanford, Richland, Washington.



M0407-1.1  
7-9-04

Figure 1. Hanford Site.



M0507-1.1  
7-13-05

Figure 2. Location of T Plant Complex and the 2706-T Facility in the 200 West Area.



M0506-1.1  
7-13-05

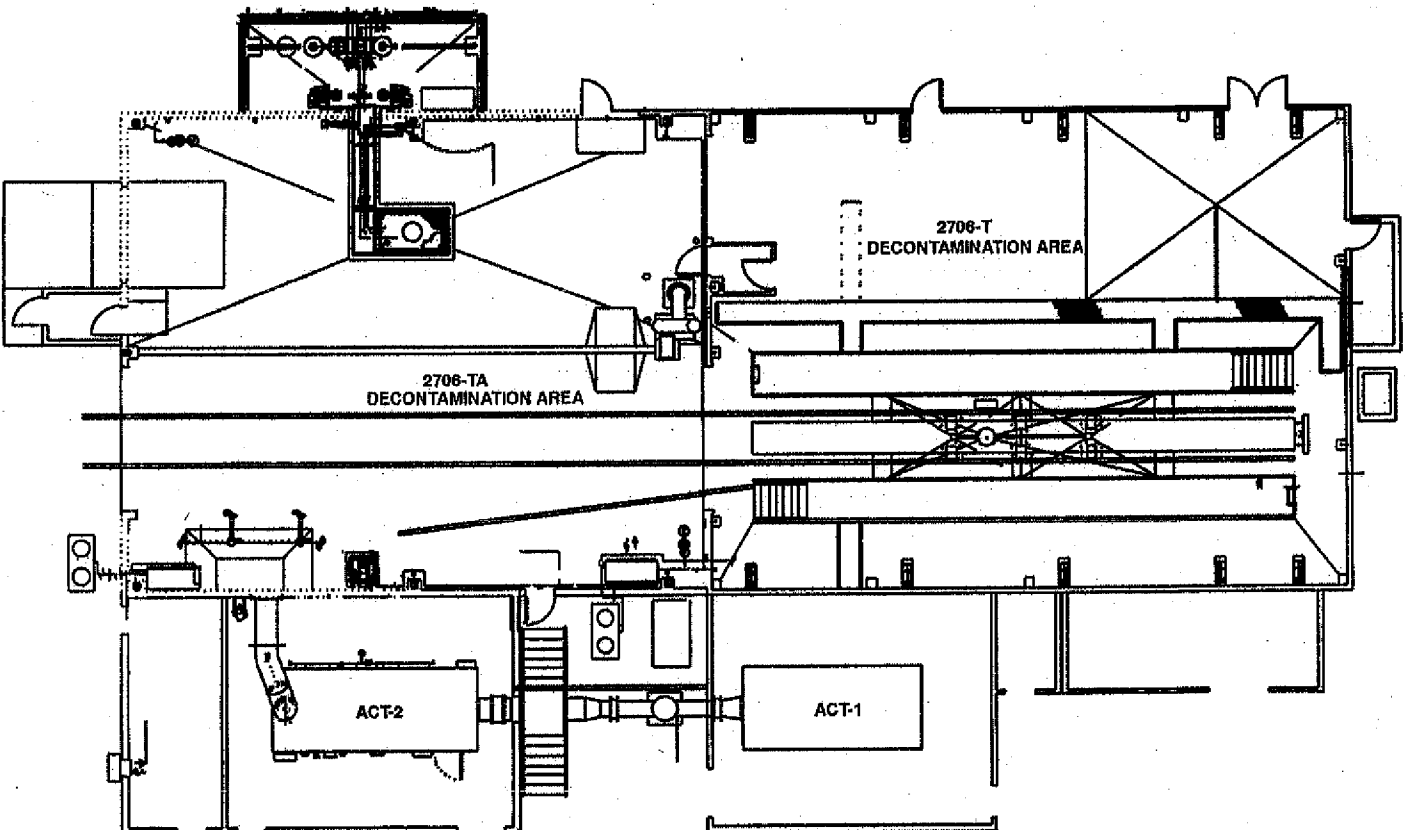


Figure 3. 2706-T Facility Floor Plan.

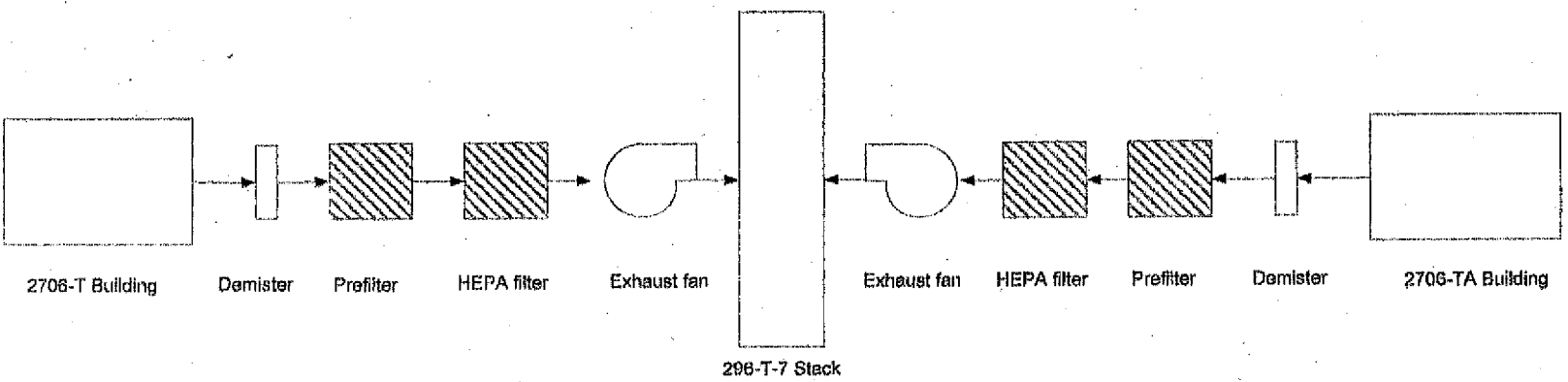


Figure 4. The 296-T-7 System Schematic.

Table 1. PTE calculations, including drum venting, torch cutting and overall operations.

Isotope	Ci/yr	Release fraction	Unabated Curies	Dose Factor (mrem/ci)	Unabated PTE mrem/yr	Abated PTE (mrem/yr)	% unabated PTE
Am-241	1.50E+00	1.00E-03	1.50E-03	17	2.55E-02	1.28E-05	4.41E-01
Am-241	1.13E+04	2.00E-09	2.25E-05	17	3.83E-04	1.91E-07	6.62E-03
Am-243	4.18E-07	1.00E-03	4.18E-10	17	7.11E-09	3.55E-12	1.23E-07
Cm-244	4.40E-03	1.00E-03	4.40E-06	9	3.96E-05	1.98E-08	6.85E-04
Np-237	3.00E-07	1.00E-03	3.00E-10	16	4.80E-09	2.40E-12	8.30E-08
Pu	3.30E-02	1.00E-03	3.30E-05	11	3.63E-04	1.82E-07	6.28E-03
Pu-238	4.50E-01	1.00E-03	4.50E-04	10	4.50E-03	2.25E-06	7.78E-02
Pu-239	7.20E-01	1.00E-03	7.20E-04	11	7.92E-03	3.96E-06	1.37E-01
Pu-240	7.00E-01	1.00E-03	7.00E-04	11	7.70E-03	3.85E-06	1.33E-01
Pu-241	2.08E+01	1.00E-03	2.08E-02	0.16	3.33E-03	1.66E-06	5.76E-02
Pu-242	3.20E-04	1.00E-03	3.20E-07	10	3.20E-06	1.60E-09	5.54E-05
U-234	4.40E-07	1.00E-03	4.40E-10	4.20E+00	1.85E-09	9.24E-13	3.20E-08
U-235	3.00E-06	1.00E-03	3.00E-09	4.00E+00	1.20E-08	6.00E-12	2.08E-07
U-238	3.40E-02	1.00E-03	3.40E-05	3.80E+00	1.29E-04	6.46E-08	2.24E-03
U-Natural	4.10E-05	1.00E-03	4.10E-08	3.70E+00	1.52E-07	7.59E-11	2.62E-06
Co-60	2.40E-01	1.00E-03	2.40E-04	0.34	8.16E-05	4.08E-08	1.41E-03
Cs-134	7.80E-03	1.00E-03	7.80E-06	0.1	7.80E-07	3.90E-10	1.35E-05
Cs-137	1.92E+01	1.00E-03	1.92E-02	0.31	5.95E-03	2.98E-06	1.03E-01
Cs-137	1.69E+05	2.00E-09	3.38E-04	0.31	1.05E-04	5.23E-08	1.81E-03
Eu-154	3.20E-02	1.00E-03	3.20E-05	0.28	8.96E-06	4.48E-09	1.55E-04
Nb-94	3.10E-02	1.00E-03	3.10E-05	1.1	3.41E-05	1.71E-08	5.90E-04
Sb-125	3.40E-03	1.00E-03	3.40E-06	3.70E-02	1.26E-07	6.29E-11	2.18E-06
Sr-90	7.90E-01	1.00E-03	7.90E-04	1.10E-02	8.69E-06	4.35E-09	1.50E-04
H-3 (gas)	2.50E+01	1.00E+00	2.50E+01	1.10E-05	2.75E-04	2.75E-04	4.76E-03
Rn-219 (gas)	2.00E-01	1.00E+00	2.00E-01	8.30E-04	1.66E-04	1.66E-04	2.87E-03
Rn-220 (gas)	3.00E+01	1.00E+00	3.00E+01	6.20E-06	1.86E-04	1.86E-04	3.22E-03
Rn-222 (gas)	2.00E+00	1.00E+00	2.00E+00	1.20E-04	2.40E-04	2.40E-04	4.15E-03
Am-241 (gas)	2.70E-06	1.00E+00	2.70E-06	1.70E+01	4.59E-05	4.59E-05	7.94E-04
Cs-137 (gas)	2.70E-03	1.00E+00	2.70E-03	3.10E-01	8.37E-04	8.37E-04	1.45E-02
Total					5.78E-02	1.78E-03	
Total gas					1.75E-03	1.75E-03	3.03E-02
Tot. Alpha	1.13E+04		3.22E+01		5.05E-02	6.63E-04	
Tot. B/G	1.69E+05		2.50E+01		7.30E-03	1.12E-03	
Total PTE					5.78E-02	1.78E-03	

Torch cutting contribution assumptions

Cuts will be 1/16 inches wide, 10 containers ea. 24 in diameter X 36 in hi, 2 cuts vertical 1 cut horizontal  
 surface area (square meters) =  $(1 \times 10 \times \pi \times 24 \times .3048 \times .3048 / 16 / 144) + (2 \times (36 \times 2 + 24 \times 2) / 12 \times .3048 \times 1 / 16 / 12 \times .3048) \times 8 = 1.01017412$

Contamination levels are 6,000 dpm/100 sq cm alpha or 6,000,000 dpm/100 sq cm beta/gamma.

Curies = (surface area in sq meters \* contamination in dpm/100 sq cm) /  $(1 \times 10^4 \text{ sq meter/sq cm} \times 2.22 \times 10^{12} \text{ Ci sq cm/sq m dpm})$  = surface area \* contamination \*  $4.5 \times 10^{-9}$ .

Drum Venting, time weighted average assumptions: 1.25 Ci Am-241/drum; 18.75 Ci Cs-137 per drum; 9000 drums

Radionuclide	Estimated inventory (Ci)	Time Factor (containers per year * 60 minutes/drum)	Release fraction	Unabated Release Rate (Ci/yr)	Abated Release Rate (Ci/yr)	Unit Dose Factor	Unabated Dose (mrem/yr)	Abated Dose (mrem/yr)
Alpha	1.13E+04	1.03E+00	1.00E-03	1.28E-03	6.42E-07	1.70E+01	2.18E-02	1.09E-05
Beta	1.69E+05	1.03E+00	1.00E-03	1.92E-02	9.62E-06	3.10E-01	5.97E-03	2.98E-06